

An analysis of Ethiopia's Productive Safety Net Program and its linkages

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Abstract

1. Introduction

Chronic food insecurity has been a defining feature of the poverty that has affected millions of Ethiopians for decades. The vast majority of these extraordinarily poor households live in rural areas that are heavily reliant on rainfed agriculture and thus, in years of poor rainfall, the threat of widespread starvation is high. Since the tragic 1983-84 famine, the policy response to this threat has been a series of ad hoc emergency appeals for food aid and other forms of emergency assistance. While these have succeeded in averting mass starvation, especially among the asset-less, they have not banished the threat of further famine and they did not prevent asset depletion by marginally poor households affected by adverse rainfall shocks. As a result, the number of individuals in need of emergency food assistance rose from approximately 2.1 million people in 1996 to 13.2 million in 2003, before falling back to 7.1 million in 2004 (World Bank 2004). Further, the ad hoc nature of these responses meant that the provision of emergency assistance—often in the form of food-for-work programs—was not integrated into ongoing economic development activities (Subbarao and Smith 2003).

Starting in 2005, the Government of Ethiopia and a consortium of donors implemented a new form of safety net: the Productive Safety Nets Program (PSNP). It reaches more than 7 million people and operates with an annual budget of nearly 500 million USD. Currently, outside of South Africa, it is the largest social protection program operating in sub-Saharan Africa. The PSNP operates as a safety net, targeting transfers to poor households in two ways, through public works (PW) and direct support (DS). Public works, the larger of the two programs, pays selected beneficiaries 6 birr/day for their labor on labor-intensive projects designed to build community assets. Direct support, in the form of cash or food transfers, is provided to labor-scarce households including those whose primary income earners are elderly or disabled in order to maintain the safety net for the poorest households who cannot participate in public works. It is complemented by a series of food security activities, collectively referred to as the Other Food Security Program (OFSP). This includes access to credit, agricultural extension, technology transfer (such as advice on food crop production, cash cropping, livestock production, and soil and water conservation), and irrigation and water

harvesting schemes. This complementarity is central to the objectives of the PSNP, which are:

... to provide transfers to the food insecure population in chronically food insecure woredas in a way that prevents asset depletion at the household level and creates assets at the community level. The Programme will thus address immediate human needs while simultaneously (i) supporting the rural transformation process, (ii) preventing long-term consequences of short-term consumption shortages, (iii) encouraging households to engage in production and investment, and (iv) promoting market development by increasing household purchasing power (Ethiopia 2004).

Nearly all evaluations of social protection programs have centred on programs found in Latin America and, to a lesser extent, South Asia. Evidence from sub-Saharan Africa is much more limited and so it is of interest to examine the impact of social protection program in an African setting. There are, however, additional features of the PSNP that make such an assessment especially interesting. Recent work has speculated that social protection programs may, in fact, be integral to policy frameworks that attempt to stimulate economic growth. Particularly in rural areas of Africa, there are pervasive credit and insurance market failures. This has two adverse consequences for agriculture: farmers are liquidity constrained (and therefore, for example find it difficult to purchase fertilizers) and farmers are reluctant to take risks (for example, adopt new crops). Social protection, by providing liquidity and a reliable source of income addresses both types of market failures. Devereux (2008), Devereux et al (2008), Dercon (2005) and Hoddinott (2008) provide further examples and references. An assessment of the PSNP provides insight as to whether these hypothesized benefits are realized in a large-scale program implemented in Africa.

More specifically, using matching methods, this paper assesses whether after 18 months of operation (i.e., from January 2005 to June 2006), the PSNP together with the OFSP reduced household food insecurity; raised consumption levels; encouraged households to engage in production and investment through enhanced access to credit, increased use of modern farming techniques, and entry into non-farm own business activities; and whether it has led to sustained asset accumulation. It also investigates whether these programs have had disincentive effects, measured in terms of reduced participation in the wage labor market or in the crowding out of private transfers.

We define three types of treatment. Under the first definition, a household is considered a treatment household if it received *any* payment for undertaking work on PSNP-supported public works. Under the second definition, a household is considered a treatment household if it received at least 90 birr *per person* for undertaking work on PSNP-supported public works. This treatment group represents those households that received at least half of the amount of transfers it should have received according to the design of the program. Under the third definition, a household is considered a treatment household if it received any payment for undertaking work on PSNP-supported public works AND during this period, it received access to any component of the OFSP.

These definitions are important to our assessment of the PSNP. Using the first definition, we find little evidence of program impact. Under the second definition, access to the PSNP improves two measures of household food security: it reduces the likelihood that a household has very low caloric intake and it increases mean calorie availability. Applying matching methods to the third definition of participation (access to the public works component of the PSNP and access to the OFSP) reveals a much more positive picture. Relative to the control group, they are more likely to be food secure, and are more likely to borrow for productive purposes, use improved agricultural technologies, and operate non-farm own business activities. For these households, there is no evidence of disincentive effects in terms of the reduced supply of labor to wage employment or private transfers. However, relative to the control group, beneficiaries did not experience faster asset growth.

The paper begins by describing the data available to us and the methods used to assess impact. We then briefly review several aspects of the implementation of the PSNP as these are relevant to the implementation and interpretation of our impact assessment before turning to the results themselves.

2. Sampling Methodology, Questionnaire, and Survey Implementation¹

This paper draws on a quantitative household and community survey fielded between late June and early August, 2006. The survey was fielded in the four principal regions served by the PSNP: Tigray, Amhara, Oromiya, and Southern Nations, Nationalities and People's Region (SNNPR). Within these regions, a proportion of food-insecure *woredas* were selected in proportion to the overall number of chronically food-insecure *woredas* within that region and relative to the number of chronically food-insecure *woredas* in all four regions. Within each region, *woredas* were selected with probability proportional to size (PPS) based on the estimated chronically food insecure population (beneficiaries). The *woredas* were ordered geographically, in order to ensure geographic dispersion of the sample and to cover the range of agroecological conditions in each region. In total, 68 *woredas* were selected.

Within *woredas*, enumeration areas (EAs) where the Productive Safety Nets Program (PSNP) was active were identified.² Restricting the sample to EAs with active Productive Safety Net Programs, two enumeration areas per *woreda* were chosen using PPS sampling for Amhara, Oromiya, and SNNPR. In Tigray, three EAs per *woreda* were selected using PPS sampling. 25 households were interviewed within each EA. Using the list of PSNP beneficiary households, 17 PSNP beneficiaries for inclusion in the sample using SRS sampling and using lists of non-beneficiary households, 8 non-beneficiary households were selected using SRS sampling. This yielded a sample of 900 households in Amhara and Tigray and 950 households in Oromiya and SNNPR, giving a sample size of 3,700.

There are two limitations of the survey that should be noted. First, it would have been desirable to field this survey if it had been conducted prior to the implementation of the PSNP and other FSP, as this would have readily permitted a “before-after” and “with-without” evaluation design. In the absence of a prior survey, we included a wide range of retrospective questions about household size and composition, assets, prior experiences with emergency assistance, and selected food security outcomes such as the size of the

¹ Gilligan, Hoddinott, Taffesse, Dejene, Tefera and Yohannes (2007) provide a more detailed description of the survey.

² By active, we mean that program administrative structures were in place, there existed a list of beneficiaries and the PSNP had provided assistance for at least one month in the last 12 months.

food gap. These retrospective questions, phrased in terms of asking about these characteristics two years prior to the survey (i.e., six months before the PSNP began), make it possible to re-create pre-baseline conditions for beneficiary and non-beneficiary households. While this is a solution to the absence of a pre-program survey, it represents a second best solution. Second, survey timing within the calendar year was good, but not ideal. The main agricultural season in Ethiopia runs from July to December, although there are regional variations within this period; for example, the season starts somewhat later in Tigray and Amhara. Public works projects undertaken as part of the PSNP are supposed, for the most part, to occur outside of the agricultural season, i.e., from January to June. Given our survey timing, we have extensive information on participation in PSNP activities from January-May 2006 (as well as from June-December 2005), but we miss any activities that occur in June or July 2006.

3. Evaluation methodology: Measuring Impacts by Propensity Score and Nearest Neighbor Matching

We used two matching techniques, propensity score matching (PSM) and nearest neighbor matching (NNM).³ The basic idea underpinning both approaches is to construct a statistical comparison group by matching non-beneficiaries to beneficiaries using observable characteristics from before the program that are correlated with the probability of being in the program and with the outcome variables of interest. The approach to estimating impacts using PSM involves estimating a model that predicts the probability of each household receiving the PSNP on a sample of PSNP beneficiaries and non-beneficiaries. Each beneficiary, or “treatment,” household is then matched to one or more non-beneficiary households based on having a similar estimated probability of being in the program, or “propensity score.”⁴ Using this sample of matched beneficiaries and non-beneficiaries the impact estimate is then constructed as the average difference in beneficiary outcomes and a weighted average non-beneficiary outcome, using the

³ A “randomized” evaluation design was not possible for the PSNP because the program was implemented on a large scale entirely within the first year.

⁴ Specifically, we match treatment and comparison observations by local linear matching with a tricube kernel using Stata’s `psmatch2` command (Leuven and Sianesi 2003). Standard errors of the impact estimates are estimated by bootstrap using 100 replications.

propensity scores to construct the weights. To confirm that the impact estimates using PSM are robust to estimation method, we also estimate impacts using NNM. Like PSM, NNM matches each beneficiary household to one or more non-beneficiary households based on pre-program household and community characteristics. However, NNM matches directly on the variables themselves by selecting non-beneficiaries for the match that minimize the average difference in characteristics from the beneficiary using a multidimensional metric to determine the weights for constructing the average.

A strength of these matching approaches is that they can provide reliable estimates of program impact provided that (1) a comparable group of non-beneficiary households is available, and (2) there is access to carefully collected household survey data with many variables that are correlated with program participation and the outcome variables. The PSNP sample was designed to include an appropriate comparison group. The sample is drawn exclusively from *woredas* operating in the PSNP, and roughly one-third of the sample is made up of non-beneficiary households living in the same communities as PSNP beneficiaries. Also, the PSNP survey includes a large set of variables affecting household welfare and program participation. These variables include measures of household head age, gender and schooling, household size and other demographic characteristics, asset levels before the program, distance to markets, indicators of social networks, exposure to economic shocks in the two years before the PSNP, and controls for unobserved *woreda*-level effects.⁵

These approaches rely on two assumptions about the data and the model. The first assumption is that, after controlling for all pre-program observable household and community characteristics that are correlated with program participation and the outcome variable, non-beneficiaries have the same average outcome as beneficiaries would have had if they did not receive the program. Matching will provide biased estimates of program impact if, for any chosen outcome, it is not feasible to control for enough observable characteristics so that the first assumption holds. Having non-beneficiary households from the same communities as PSNP beneficiaries helps to reduce the risks of such bias by providing a similar distribution of unobserved community characteristics

⁵ For a complete list of variables used in estimating the propensity score models and estimation results for a subset of these models, see the Technical Appendix.

like access to markets or local economic shocks. Also, where it was possible to gather information on outcome variables from before the start of the program, such as value of asset holdings and qualitative measures of food security, outcomes can be measured as average changes in household welfare measure since the start of the program. When outcomes are measured in changes in this way, we estimate the impact as the “difference in differences” (DID) in the outcome between the treatment and comparison group, rather than the “single difference” in outcomes between these two groups after the start of the program. DID estimates from household panel data are known to be less subject to selection bias because they remove the effect of any fixed unobservable household variable that is not changing over time.

The second assumption is that for each beneficiary household and for all observable characteristics, a comparison group of non-beneficiaries with similar propensity scores exists. Heckman, Ichimura, and Todd (1997, 1998) emphasize that the quality of the match can be improved by ensuring that matches are formed only where the distribution of the density of the propensity scores overlap between treatment and comparison observations, or where the propensity score densities have “common support.” Common support can be improved by dropping treatment observations whose estimated propensity score is greater than the maximum or less than the minimum of the comparison group propensity scores. Similarly, comparison group observations with a propensity score below the minimum or above the maximum of the treatment observations can be dropped. A shortcoming of this approach identified by Heckman, Ichimura, and Todd (1997) is that treatment observations near these cut points face a potential comparison group with propensity scores that are either all lower or all higher than that of the treatment observation. To account for this problem, we modified this “min/max” approach to identifying a region of common support using the following procedure. We first estimated the probit model for program participation and identified the lower and upper cut points in the comparison or treatment groups. Typically only comparison observations were dropped in the left of the distribution and treatment observations were dropped on the right. We then added back the 5 percent of comparison observations from each tail that had been dropped that were closest in terms of propensity score. Again, typically this involved adding back comparison observations cut from the

lower tail of the distribution. In addition, we trimmed the treatment observations from the interior of the propensity score distribution that had the lowest density of comparison observations. We choose to drop 2 percent of treatment observations with this trimming procedure. On this common support sample, the probit model was estimated again to obtain a new set of propensity scores to be used in creating the match. We also tested the “balancing properties” of the data by testing that treatment and comparison observations had the same distribution (mean) of propensity scores and of control variables within groupings (roughly quantiles) of the propensity score. All results presented below are based on specifications that passed the balancing tests.

4. The PSNP and OFSP in Practice

Gilligan et al. (2007) provide a detailed discussion of the implementation of the PSNP and OFSP. Here, we restrict ourselves to a brief summary here as well as an assessment of their implications for the implementation of the evaluation strategy described in section 3.

4.1 Targeting

Within food insecure *woredas*, chronically food-insecure households were identified using a mix of administrative guidelines and community knowledge. Chronic food security was defined as existing when a household faced continuous food shortages (usually three months of food gap⁶ or more) in the last three years and received food assistance. Households that had experienced shocks that had led to severe asset losses were also eligible. Gilligan et al. (2007) show that beneficiaries reported, on average, larger food gaps in the period prior to the implementation of the PSNP and they were considerably more likely to report having food gaps that exceeded three months prior to the implementation of the PSNP. Beneficiaries were more likely to have reported experiencing drought shocks and had, on average, lower levels of non-land assets. Participants in the Public Works program are more likely to come from male-headed

⁶ The food gap is defined as the number of self-reported months that a household has difficulty satisfying its food needs.

households with a married head. PSNP beneficiaries have larger households, on average, in Tigray, Amhara and Oromiya, but not in SNNPR.

4.2 Provision of Work and Timeliness of Payment

For a variety of reasons, not all households received PSNP benefits in both years that the program functioned. From the detailed questions asked about participation in public works, we know which households received at least one day of employment in the previous 12 months (approximately June 2005-May 2006). The survey also asked households if they had received assistance (food or cash for work or free food or cash) in the 12-24 month period prior to the survey (i.e., June 2004-May 2005). Just over 22 percent of households that did not receive work between June 2005 and May 2006 reported receiving some assistance between June 2004 and May 2005. Half the households participating in public works between June 2005 and May 2006 had not received any assistance in the 12 months prior to that period. This shifting in and out of assistance programs has two implications for our evaluation strategy. First, the expected positive impacts for public works participants may be less than expected because many current beneficiaries have received benefits for only one year or less. Second, some of the households in the control group are past beneficiaries and we might expect their food security and other welfare outcomes to be better than would be the case if they were “pure” controls who had not received any benefits. Both implications suggest that our estimates of impact will be biased downward, i.e., they will be smaller than one might have expected.

Not only are there variations in access across years, there are considerable variations in the amount of days worked across regions. Households in Tigray worked more days than households elsewhere, although the differences in days worked between Tigray, Amhara, and SNNPR in the period January-June 2006, are relatively small. In the same period, households in Oromiya worked significantly fewer days than households in other regions. As a result, there are marked regional variations in the size of transfers made to public works households. Between January and June 2006, Tigray households with members employed in public works received approximately 50 birr per month. Comparable figures for the other regions are 30 birr per month in Amhara, 39 birr per

month in Oromiya, and 56 birr per month in SNNPR. However, proportionately these are smaller than the variations in days employed reflecting significant wage arrears in both Tigray and Amhara.

Not only are there these regional differences in days worked and wage arrears, there are also regional differences in the amount of employment received. Households targeted for public works employment were planned to receive up to five days work per month (at a wage of 6 birr per day or its equivalent in food) for *each* household member. Using our survey data, we can calculate the ratio of the number of days of planned employment to the number of days of actual employment. For the period January-May 2006, mean values of these ratios range from a low of 0.23 in Oromiya to a high of 0.48 in Tigray. Because of wage arrears, the ratio of actual payments to planned payments is lower, ranging from a low of 0.11 in Amhara to 0.40 in SNNPR. If we restrict attention to a shorter, more recent period (March-May 2006), these ratios improve. The ratio of planned to actual employment is only 0.38 in Oromiya; elsewhere it is 0.71 in SNNPR, 0.73 in Amhara, and 0.80 in Tigray. But even in this period, actual payments lag planned payments, ranging from 0.10 in Amhara to 0.38 in SNNPR.

The fact that actual employment is less, often considerably less, than planned employment, and the fact that there are significant wage arrears carry a number of implications, none of them welcome for our assessment of impact. First, a key outcome is the number of months that a household has a food gap. Because these poor households are liquidity constrained (i.e., they have limited ability to borrow or save), their current consumption is tied fairly tightly to current income. So even if households received full payment—albeit delayed—for their work, the existence of wage arrears makes it difficult for beneficiary households to reduce their food gap. Second, because observed payments⁷ are much lower than were planned, the ability of the program to increase asset levels (via savings out of transfer income) is circumscribed.

4.3 Links to the Other Food Security Program

Access to the OFSP varied significantly by region. Access was best in Tigray, where 69 percent of households who had obtained public works employment under the PSNP also

⁷ A cautionary note: it is possible that households received payments for work undertaken in 2006 but received these after May 2006 (the last month for which our survey recorded payments).

reported receiving support from at least one component of the OFSP and 49 percent reported receiving access to multiple components. More than 15 percent of these Tigrayan households reported receiving support from programs that provided access to improved seeds, irrigation and water-harvesting schemes, soil and water conservation, credit, the provision of livestock or of chicks. Further, 27 percent received crop production extension services in the previous production year and 56 percent had contact with a Development Agent (DA). Access to the OFSP was somewhat lower in Amhara, where 29 percent of households who had obtained public works employment under the PSNP also reported receiving support from at least one component of the OFSP and 14 percent reported receiving access to multiple components. Only 6 percent received crop production extension services and 29 percent had contact with a Development Agent. Access to the OFSP was even lower in Oromiya and SNNPR with 12 and 20 percent of households receiving services, respectively.

5. The impact of the PSNP and OFSP

5.1 Defining Program Participation

These features of program implementation create challenges in terms of defining treatment and control households. We use three definitions which, broadly speaking correspond to increasing levels of program exposure.

Definition 1

A household is considered a treatment household if, in the period June 2005-May 2006, it received any payment for undertaking work on PSNP-supported public works. We refer to these households as PW-PSNP beneficiaries. A household is considered a control household if, in the same period, it was either a non-PSNP participant *or*, while listed as a PSNP participant, did not receive any payments for public works activities. Households that received Direct Support are excluded from both treatment and control groups.

Definition 2

A household is considered a treatment household if, in the period June 2005-May 2006, it received at least 90 birr *per person* (at a wage of 6 birr per day, equivalent to 15 days work *per person*) for undertaking work on PSNP-supported public works. A household is

considered a control household if, in the same period, it was not a PSNP participant, that is, it did not supply any work or receive any payments for public works activities. Households that received Direct Support are excluded from both treatment and control groups. This treatment group represents those households that received at least half of the amount of transfers it should have received according to the design of the program. We considered an alternative to this definition under which a treatment household was one that had received all benefits it was intended to receive. However, the samples were not large enough to estimate the impact of the PSNP under this definition.

Definition 3

A household is considered a treatment household if, in the period June 2005-May 2006, it received any payment for undertaking work on PSNP-supported public works AND during this period, it received access to any component of the OFSP (access to improved seeds, irrigation and water-harvesting schemes, soil and water conservation, credit, the provision of livestock or of chicks, crop production extension services, or had contact with a Development Agent). We refer to these households as PW-PSNP-OFSP beneficiaries. A household is considered a control household if, in the same period, it was either a non-PSNP participant *or*, while listed as a PSNP participant, did not receive any payments for public works activities AND did not have access to any component of the OFSP. Households that received Direct Support are again excluded from both treatment and control groups.

There are a number of features of these definitions worth noting. Households that had been previous PSNP beneficiaries (or past beneficiaries of emergency food assistance) but are not current beneficiaries are included in the control group. Other things equal, this will tend to bias downward estimates of impact. To see why, consider two households. One receives 100 birr from the PSNP in 2004-05; the second receives an identical amount in 2005-06. Under both definitions, the first household is part of the control group while the second is included in the treatment group. Given that they received the same level of transfers—albeit in different years—it is not clear why the treatment group defined here will have higher levels of assets than the control group. We experimented with the definition of treatment, for example, amending the *definition 1* so

that a treatment household had received PSNP benefits in both years preceding the survey and a control household as having received PSNP benefits in neither year. While this has the advantage of sharpening the difference between treatment and control households, it comes at the cost of a reduced sample size and therefore less statistical power. While we produced preliminary estimates using this alternative definition, it does not produce additional results that inform our overall assessment of impact.

Finally, from a policy and operational perspective, it would be helpful to understand which components of the OFSP had the greatest impact on outcomes of interest. Unfortunately, because coverage of the OFSP was so sparse, we do not have a sufficiently large sample to investigate this.

5.2 Defining Outcomes

We consider a broad set of outcomes. Thematically, these are divided into eight categories:

(1) Household food security indicators assess whether the PSNP reduced the prevalence and severity of the chronic food insecurity experienced by poor households living in food-insecure parts of the country. We use a number of indicators of household food security that reflect recent (7 day and one month) status, the magnitude of the food gap, and coping strategies used to deal with food shortages.

(2) Per capita consumption is a useful summary measure of household welfare. Variation in this measure is easier to measure than income and less subject to short-term economic effects. As such, it provides a better reflection of differences in permanent income. Not only is household consumption expenditure a useful indicator in its own right, improvements in this outcome may contribute to the objective of promoting market development by increasing household purchasing power.

(3) Access and use of credit, (4) Use of improved agricultural technologies, and (5) Entry into and participation in nonfarm business activities. These outcomes provide evidence as to the program's success in supporting the rural transformation process and in encouraging households to engage in production and investment.

(6) Labor market participation and (7) Transfers and remittances: A persistent concern in policy debates surrounding safety nets is whether their provision reduces work

effort in other income-generating activities or crowds out private transfers and these are also addressed in this set of outcomes. Finally, graduation from the PSNP requires that households accumulate assets and the last outcome considered here; changes in the value of farm assets provides insights into whether this is occurring.

(8) Assets: Have beneficiaries increased their stock of assets?

Table 1 provides a brief summary of how these indicators were constructed as well as an explanation of how to interpret the signs and magnitudes of the estimates of impact.⁸

5.3 Assessment of Impact Using Access to the PSNP as Treatment

In this section, we report the results of using matching methods to assess the impact of access to the PSNP.⁹ Specifically, following the discussion of *Definition 1* above, treatment households received any payment for undertaking work on PSNP-supported public works in the period June 2005-May 2006. We estimate impact by region and for all observations aggregated. Because we consider 27 different outcomes, we have more than 100 impact assessments. Given this number, rather than comment on each impact, we focus on the main results coming from Tables 2 to 4.

The most striking result across these tables is the absence of impact. If we consider the results for the aggregate sample, we find statistically significant impacts on only five of these 27 outcomes. Access to the public works component of the PSNP increases the likelihood that households enter the credit market and undertake own business activities. However, treatment households, relative to the control group, have slower asset growth. In all four regions, treatment households experienced positive growth in their holdings of tools and livestock. However, control households experienced even faster asset growth, thus resulting in a negative program impact. Finally, PW-PSNP beneficiaries were three percentage points less likely to enter the wage labor market over the previous years, suggesting a (small) disincentive effect on labor supply. Disaggregating this by gender, we see that this is a consequence of reduced

⁸ In preliminary work, we also considered impact on agricultural productivity but because these yielded few significant impacts, we have not reported them here.

⁹ We also applied nearest neighbor matching techniques, but these did not lead to qualitatively different results and so are not reported here.

entry by males; there is no program impact on the likelihood that women enter the wage labor market.

Disaggregating these impacts by region does not reveal very much in the way of additional positive evidence of imp act. While Tigrayan households report higher per capita caloric consumption in the last seven days, this is the only region where there is a positive, statistically significant impact. While credit use is higher among PW-PSNP beneficiaries in Amhara relative to the control group, this is driven largely by increased demand for consumption credit. It is not entirely clear that this is a welcome development; given the delays in payments for public works in Amhara, this result is consistent with PW-PSNP beneficiary households taking out loans (possibly backed by future payments from public works employment) to finance current consumption. In SNNPR, PW-PSNP beneficiary households were more likely to use fertilizer and improved seeds. In Tigray and SNNPR, they were more likely to be engaged in non-farm own business activities.

5.4 Assessment of Impact Using the 90 Birr per Household Member Definition of Household Participation in the PSNP

Following the discussion of *Definition 2* above, treatment households are those that received payments of at least 90 birr per person for work on PSNP-supported public works in the period June 2005-May 2006. One feature that will become immediately obvious is that we encounter a fairly serious sample size problem. The region-specific sample was largest in Tigray, so we only estimate impact using this definition for households in Tigray and for the sample as a whole. For this definition, the use of nearest neighbor matching does make some difference, generally producing estimates with smaller standard errors and thus larger t statistics. For consistency with the results reported in sections 5.3 and 5.5, we report the PSM results (in Tables 5-7), but our focus is on the nearest neighbor results found in Tables 8-10.

Using this definition, we find that access to the PSNP in Tigray, and across the full sample improves two measures of household food security: it reduces the likelihood that a household has very low caloric intake and it increases mean calorie availability. There is a significant reduction in the likelihood that Tigrayan households report having difficulties repaying production loans; in Tigray and across the whole sample, they are

more likely to be operating non-arm businesses. However, under this definition, Tigrayan households are less likely to use improved seed and are less likely to have entered wage employment in the previous two years. The latter result also holds for the sample as a whole when we use PSM (see Table 7), although not when we use matching. When we disaggregate by gender, we observe that this is a consequence of reduced entry into wage labor by males; entry by women is not affected. The reasons for the adverse impact on seed adoption are not obvious. With respect to the latter, it may be that the sheer number of days Tigrayan households, particularly men, work in PSNP (recall it is much higher than that reported in other regions) has precluded some households from entering wage employment. Finally, we note that there is a reduction in the number of meals consumed by children during the hungry season. However, the magnitude of this effect (0.10-0.15 of a meal) is tiny.

5.5 Assessment of Impact Using Access to the PSNP and OFSP as Treatment

Following the discussion of *Definition 3* above, treatment households received any payment for undertaking work on PSNP-supported public works in the period June 2005-May 2006 and they received access to at least one intervention or service provided under the OFSP. Results are reported in Tables 11 to 13. Unlike the discussion above, nearest neighbor matching does not produce results that are qualitatively different from those for PSM and so, in the interests of brevity, we only report the PSM results.

The striking feature of these tables is the relatively large number (9) of statistically significant impacts at the 5 percent level; two others are significant at the 10 percent level. Tables 11-13 show that relative to the control group, PW-PSNP-OFSP beneficiaries are more likely to be food secure, to borrow for productive purposes, and use improved agricultural technologies. There is no evidence that PW-PSNP-OFSP participation reduces labor supply to the wage labor market by either men or women, or crowds out private transfers.

Table 11 shows no difference between treatment and control households in the prevalence of current household food security, as measured by whether the household had available for consumption 1,800 kcal per person per day. However, mean caloric availability is higher, by nearly 10 percent in PW-PSNP-OFSP beneficiary households

compared to the control group.¹⁰ While this positive impact is most marked in Tigray, it is also observed in Amhara and SNNPR. In terms of the food gap, a key outcome measure for the FSP, the PW- PSNP-OFSP has a sizeable (1.6 months) positive impact on this measure of food security in Tigray. Across all sampled households, food security improves by 0.36 months among PW-PSNP-OFSP beneficiary households when compared to the control group and this impact is statistically significant at the 5 percent level. Further, the severity of the food gap is reduced as shown by the negative and statistically significant impact on the change in the square of the food gap. However, there is no impact on the prevalence of one of the more serious household coping strategies, reducing meals served to children.¹¹ The PW- PSNP-OFSP has a small (4.7 birr per person per month), positive impact on per capita food expenditure, although this is only significant at the 10 percent level.¹²

One of the objectives of the OFSP is to increase households' use of credit. Achieving this goal requires actions on both the demand and supply side of the credit market, i.e., households must be willing to borrow and there must be availability of funds that can be borrowed. Table 12 shows that credit use by PW- PSNP-OFSP beneficiaries was 12 percentage points higher than the control group, an increase driven entirely by the increase in demand for credit for production purposes.¹³ One concern, however, is that there is an increase, again relative to control group, in the likelihood that household borrowing for production purposes were more likely to report that they had, or anticipated having, difficulties in repaying these loans. Fear of difficulties in repaying loans is the reason given by 36 percent and 44 percent of households in Tigray and Amhara, respectively, who did not borrow money in the previous 12 months. Particularly

¹⁰ As a specification check, we also estimated impact after transforming this variable to logs. Doing so does not qualitatively change these findings.

¹¹ We considered four other coping strategies. We find no impact on meal frequency by adults during the hungry season, consumption of less preferred foods, or consumption of wild foods. Puzzlingly, there is a slight increase in the consumption of saved seeds. However, we are unsure how to interpret this result, given the absence of impacts on other coping strategies. It is possible that PW-PSNP-OFSP beneficiaries are able to save more seeds relative to households in the control group and thus can consume more of these during periods of stress.

¹² We also estimated impact after transforming these outcomes into logs. Again, doing so does not qualitatively change these findings.

¹³ We also estimated the impact of access to PW-PSNP-OFSP on the size of these loans. Relative to control households, beneficiaries took out larger loans for production purposes; there was no difference in the size of consumption loans.

in Tigray and Amhara, many of these loans that households have taken out appear to be relatively large (the median loan size for all surveyed households who borrowed money is 500 and 429 birr, respectively) and it may be that these relatively large loans are proving to be challenging to repay.

There is a striking large increase in the use of fertilizer—nearly 10.7 percentage points—by PW-PSNP-OFSP beneficiaries. This represents a 66 percent increase relative to the control group with broadly similar point estimates of impact found in all regions. There is an increase of 4.8 percentage points in the use of improved seeds, albeit from a very low base and this, too, is found across all regions.¹⁴

PW-PSNP-OFSP does not appear to crowd out non-farm own business activities; in fact, relative to control households, they are 6.7 percentage points more likely to operate these enterprises. This is most marked in Amhara—where there is evidence that program participation has facilitated entry into these activities over the last two years. There is no evidence to suggest that PW-PSNP-OFSP crowds out private transfers and no evidence that it reduces participation in wage employment.

Finally, we considered whether PW-PSNP-OFSP beneficiaries experience more rapid asset growth than control households. While participants in these programs do experience asset growth, they do so at a slower rate than comparable control households, suggesting that by itself the PSNP and OFSP programs are not raising the rate of asset accumulation. As a check on the robustness of these findings, we examined other forms of asset accumulation—such as improvements in housing stock—but do not find any evidence of program impact.

It is worth considering how differences in the samples used to construct the impact estimates for PW-PSNP and those for joint receipt of PW-PSNP and OFSP may be contributing to the differences in impacts observed. In the matched samples that satisfied all requirements to be included in the impact estimates, there were 1,758 household observations for the PW-PSNP impact analysis and 639 household observations for estimating the joint impact of PW-PSNP and OFSP. This difference in sample sizes would provide greater statistical power to the sample used for the PW-PSNP

¹⁴ We assessed impact on use of pesticides but found no evidence suggesting that access to the PW-PSNP-OFSP increased its usage.

analysis, suggesting that sample size was not responsible for the stronger impacts observed for joint PW-PSNP and OFSP participation.

An important question is whether the larger impacts for households who received PW and OFSP (and not just PW) are due entirely to the incremental effect of OFSP or to greater involvement in PW as well. We examined whether PW beneficiaries that also received OFSP worked more days or received higher transfers than PW beneficiaries on average. In the full sample, PW beneficiaries who also received OFSP worked 7 more days in PW per household member, on average, in the past 12 months. Also, PW beneficiary households who also received OFSP earned an average of 20 birr per household member more from PW in the past 12 months than the full sample of PW beneficiaries.

These results suggest that the greater impacts found for joint PW-OFSP participation is due in part to higher transfers from PW for households in this sample. However, given the relative difference in the size of impacts for PW-OFSP beneficiaries compared to PW beneficiaries, on average, it is unlikely that most of this effect is due to a difference in PW receipts of only 20 birr (a 21 percent increase in PW receipts). Also, these results reflect regional differences in both the coverage of OFSP and in the impact of PW and the OFSP. PW beneficiaries in Tigray were much more likely to receive the OFSP. Half of all joint beneficiaries of PW and the OFSP in the sample come from Tigray.

We also considered what components of the OFSP may be responsible for the positive impacts of this program when provided with PW transfers. Although the evaluation design and sample do not permit constructing separate impact estimates for each component of the OFSP, the prevalence of each component is informative. Table 14 shows the share of joint PW-OFSP beneficiaries who received each component of the OFSP. More than half of the joint beneficiaries received soil and water conservation services and almost 40 percent received credit. Nearly one-third of joint beneficiaries received irrigation. Receiving improved seeds, access to pasture, or livestock were also common, with 18 percent of joint beneficiaries claiming access in each of these categories.

The prominent role of soil and water conservation (SWC) activities is somewhat of a puzzle, since officials at the Food Security Coordination Bureau indicate that SWC activities are not formally part of the OFSP. It is worth noting that 85 percent of OFSP beneficiaries received other services, so the SWC activities indicated by respondents are not entirely responsible for the observed joint PW-OFSP impacts. There is some possibility that these SWC activities were actually conducted by the DA, since two-thirds of respondents who said they received SWC support from OFSP in the past 12 months also indicated they received SWC support from the local DA elsewhere in the survey. Also, 25 percent of households who received SWC support from the OFSP also received extension services. If the SWC activities observed were not explicitly part of the OFSP, in many cases they may have been provided by the DA or by extension agents. In either case, the results suggest that providing soil and water conservation services is one of the ways—but certainly not the only way—in which the OFSP can complement PW transfers to increase impacts on household well-being.

6. Conclusions

In a narrow sense, this paper assesses whether, after 18 months of operation (i.e., from January 2005 to June 2006), the Productive Safety Nets Program together with the Other Food Security Program, reduced household food insecurity; raised consumption levels; encouraged households to engage in production and investment through enhanced access to credit, increased use of modern farming techniques, and entry into nonfarm own business activities; and whether it has led to sustained asset accumulation. It also investigates whether these programs have had disincentive effects, measured in terms of reduced participation in the wage labor market or in the crowding out of private transfers. More broadly, it provides evidence of the role that social protection can play in stimulating growth and rural development.

We used Propensity Score Matching and Nearest Neighbor Matching to estimate impact. Informed by how the program operated on the ground, we define three types of treatment. Under the first definition, a household is considered a treatment household if, in the period June 2005-May 2006, it received any payment for undertaking work on

PSNP-supported public works. Under the second definition, a household is considered a treatment household if, in the period June 2005-May 2006, it received at least 90 birr *per person* for undertaking work on PSNP-supported public works. Under the third definition, a household is considered a treatment household if, in the period June 2005-May 2006, it received any payment for undertaking work on PSNP-supported public works AND during this period, it received access to any component of the OFSP.

These definitions are important to the assessment of impact. Using the first definition, our matching estimates find little evidence of program impact. By contrast, using the second definition, we find that access to the PSNP improves two measures of household food security: it reduces the likelihood that a household has very low caloric intake and it increases mean calorie availability. Applying matching methods to the third definition of participation (access to the public works component of the PSNP and access to the OFSP) reveals a much more positive picture. Relative to the control group, they are more likely to be food secure, and are more likely to borrow for productive purposes, use improved agricultural technologies, and operate nonfarm own business activities. For these households, there is no evidence of disincentive effects in terms of the reduced supply of labor to wage employment or private transfers. However, relative to the control group, beneficiaries did not experience faster asset growth.

We end with three important caveats: (1) At the time of data collection, the program had only been operational for 18 months. For this reason, this should be considered as an interim assessment of program impact. A new survey planned for 2008 will give insights into longer-run effects of the program; (2) Despite the substantial strengths of this data set, one weakness is that the data were collected more than one year after the program began, so that the set of pre-PSNP household and community characteristics used to match beneficiaries and non-beneficiaries had to be collected through recall; and (3) Deviations between planned and actual program implementation downwardly bias estimates of impact.

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Table 1. Summary of outcome indicators

Type of outcome	Outcome	How measured	Interpretation of sign and magnitude of impact
<i>Household food security</i>	Shortfall in caloric availability	Dummy variable equaling one if daily per capita caloric acquisition in previous 7 days (see below) is less than 1,800 kcal per person per day.	A <i>negative</i> value indicates that households receiving program benefits were less likely to be food secure. A value of 0.10 means that the program increased the proportion of households above this threshold by 10 percentage points.
	Daily per capita caloric acquisition	Respondents reported the consumption of 33 different foods in the 7 days prior to the interview from purchases, stocks and amounts received as gifts, barter or in-kind payments. These quantities were converted into calories available for consumption and this value was then divided by 7 (to get a daily figure) and by household size (to get a per capita figure).	A <i>positive</i> value indicates that households receiving program benefits acquired/consumed more calories. A value of 100 means that the program increased caloric availability by 100 kcal per person per day.
	Change in months of food security, 2004-06	Difference between number of months households report having no problems satisfying the food needs of the household in the last 12 months (approximately July 2005 – June 2006) and the 12 month period two years prior (approximately July 2003 – June 2004).	A <i>positive</i> value indicates that households receiving program benefits were more food secure. A value of 1.0 means that the program increased the number of months that the household was food secure by one month. An alternative interpretation is that a value of 1.0 means that the food gap was reduced by one month.
	Change in the square of the food gap, 2004-06	Difference in the squared change in food gap (defined as the number of months that households had difficulty satisfying their food needs) between 2005-06 and 2003-04.	A <i>negative</i> value indicates that households receiving program benefits were more food secure. A negative value indicates a reduction in the food gap and an improvement in household food security.
	Number of children's meals/day, hungry season	The number of meals per day that children eat during the month when food shortages are most acute.	A <i>positive</i> value indicates that children in households receiving program benefits ate more meals per day at the height of the hungry season. A value of 1.0 means that the program increased the number of meals children consumed per day by one meal.
<i>Consumption</i>	Per capita food expenditures	Respondents reported the consumption of 33 different foods in the 7 days prior to the interview from purchases, stocks and amounts received as gifts, barter or in-kind payments. These quantities were converted to values (Birr) using household self-reports of purchases as well as food prices reported in the community questionnaire. These values were converted to a monthly figure and divided by household size to obtain a per capita figure	A <i>positive</i> value indicates that households receiving program benefits had higher levels of food consumption in value terms. A value of 10 means that the program increased per capita food consumption by 10 birr per month.
	Per capita consumption	This is the per capita value of food and nonfood expenditures. Food expenditures are described above. Nonfood expenditures include purchases of 30 nonfood items including clothing, kitchen equipment, furniture, transport, ceremonies, contributions and donations, fuel, lighting, soap, and tobacco. These were converted to monthly figures and divided by household size.	A <i>positive</i> value indicates that households receiving program benefits had higher levels of consumption of all goods (food and nonfood). A value of 15 means that the program increased per capita consumption by 15 birr per month.

(continued)

Type of outcome	Outcome	How measured	Interpretation of sign and magnitude of impact
<i>Credit use</i>	Any credit use	Dummy variable equaling one if household reported taking out a loan of at least 20 birr in the 12 months prior to the survey.	A positive value indicates that households receiving program benefits were more likely to take out a loan in the last 12 months. A value of 0.10 means that the program increased the proportion of households reporting borrowing money by 10 percentage points.
	Credit taken for production	Dummy variable equaling one if household reported taking out a loan of at least 20 birr in the 12 months prior to the survey in order to buy tools or other implements, farm inputs such as seeds, fertilizer or pesticides, livestock, pay for hired labor, start an off-farm business, or pay for education-related expenses.	A positive value indicates that households receiving program benefits were more likely to take out a loan for production purposes in the last 12 months. A value of 0.10 means that the program increased the proportion of households reporting borrowing money for production purposes by 10 percentage points.
	Credit taken for consumption	Dummy variable equaling one if household reported taking out a loan of at least 20 birr in the 12 months prior to the survey in order to pay rent, taxes, buy food or other goods for the household, pay transport expenses, buy building materials, or pay for health, wedding, or funeral expenses.	A positive value indicates that households receiving program benefits were more likely to take out a loan for consumption purposes in the last 12 months. A value of 0.10 means that the program increased the proportion of households reporting borrowing money for consumption purposes by 10 percentage points.
	Problems repaying any loan	Dummy variable equaling one if household reported it had difficulty, is currently having difficulty, or expects to have difficulty repaying a loan taken out of 20 birr or more in the 12 months prior to the survey.	A negative value indicates that households receiving program benefits were less likely to have difficulties repaying loans. A value of -0.12 means that the program reduced the proportion of households reporting such difficulties by 12 percentage points.
	Problem repaying a production loan	Dummy variable equaling one if household reported it had difficulty, is currently having difficulty, or expects to have difficulty repaying a loan of 20 birr or more taken out for production purposes in the 12 months prior to the survey.	A negative value indicates that households receiving program benefits were less likely to have difficulties repaying loans taken out for production purposes. A value of -0.15 means that the program reduced the proportion of households reporting such difficulties by 15 percentage points.
	Problem repaying a consumption loan	Dummy variable equaling one if household reported it had difficulty, is currently having difficulty, or expects to have difficulty repaying a loan of 20 birr or more taken out for consumption purposes in the 12 months prior to the survey.	A negative value indicates that households receiving program benefits were less likely to have difficulties repaying loans taken out for consumption purposes. A value of -0.10 means that the program reduced the proportion of households reporting such difficulties by 10 percentage points.
<i>Use of improved agricultural technologies</i>	Use of fertilizer	Dummy variable equaling one if the household reported using any fertilizer (DAP or urea) on food or cash crops between June 2005 and the date of interview.	A positive value indicates that households receiving program benefits were more likely to use fertilizer. A value of 0.15 means that the program increased the proportion of households using fertilizer by 15 percentage points.
	Use of improved seed	Dummy variable equaling one if the household reported using improved seed between June 2005 and the date of interview.	A positive value indicates that households receiving program benefits were more likely to use improved seeds. A value of 0.05 means that the program increased the proportion of households using fertilizer by 5 percentage points.

(continued)

Type of outcome	Outcome	How measured	Interpretation of sign and magnitude of impact
<i>Own business activity</i>	Any nonfarm own business activity in past 12 months	Dummy variable equaling one if at least one household member had undertaken an off-farm business activity (such as weaving or other handicrafts, trade, the collection and sale of firewood or dungcakes, the manufacture and sale of tella, araqi, or injera) in the 12 months prior to the survey.	A <i>positive</i> value indicates that households receiving program benefits were more likely to participate in an off-farm business activity. A value of 0.18 means that the program increased the proportion of households operating their own off-farm businesses by 18 percentage points.
	Entry into nonfarm own business in past 2 years	Dummy variable equaling one if a household member started a nonfarm own business activity in the last two years.	A <i>positive</i> value indicates that households receiving program benefits were more likely to start an off-farm business at some point in the last 2 years. A value of 0.04 means that the program increased the proportion of households starting such businesses by 4 percentage points.
<i>Assets</i>	Change in log value of livestock and tools, 2004-06	Difference on the log values (birr) of livestock and agricultural tools owned by the household in 2004 and 2006.	A <i>positive</i> value indicates that households receiving program benefits increased their holdings of these assets between 2004 and 2006. A value of 0.25 implies that asset holdings increased by 25 percent between 2004 and 2006.
<i>Labor market participation</i>	Any wage employment in past 12 months	Dummy variable equaling one if at least one household member undertook wage employment in the 12 months prior to the survey.	A <i>positive</i> value indicates that households receiving program benefits were more likely to undertake wage work. A value of 0.08 means that the program increased the proportion of households undertaking wage work in the last 12 months by 8 percentage points.
	Any wage employment by males in past 12 months	Dummy variable equaling one if at least one male household member undertook wage employment in the 12 months prior to the survey.	A <i>positive</i> value indicates that in households receiving program benefits, men were more likely to undertake wage work.
	Any wage employment by females in past 12 months	Dummy variable equaling one if at least one female household member undertook wage employment in the 12 months prior to the survey.	A <i>positive</i> value indicates that in households receiving program benefits, women were more likely to undertake wage work.
	Share of member months of wage work by females	The household survey included questions about the number of months in the last 12 months that men and women worked. This is a continuous variable ranging between 0 (women account for no wage work) to 1 (all wage work was done by women).	A <i>positive</i> value indicates that in households receiving program benefits, women were undertaking a greater share of the wage work undertaken by the household. A value of 0.15 means that the program increased the proportion of wage work undertaken by women by 15 percentage points.
	Entry into wage employment in past 2 years	Dummy variable equaling one if a household member entered wage employment in the last two years.	A <i>positive</i> value indicates that households receiving program benefits were more likely to enter the wage labor market at some point in the last 2 years. A value of 0.06 means that the program increased the proportion of households entering into wage employment by 6 percentage points.
	Entry by males into wage employment in past 2 years	Dummy variable equaling one if a male household member entered wage employment in the last two years.	A <i>positive</i> value indicates that males in households receiving program benefits were more likely to enter the wage labor market at some point in the last 2 years.

(continued)

Type of outcome	Outcome	How measured	Interpretation of sign and magnitude of impact
	Entry by females into wage employment in past 2 years	Dummy variable equaling one if a female household member entered wage employment in the last two years.	A <i>positive</i> value indicates that females in households receiving program benefits were more likely to enter the wage labor market at some point in the last 2 years.
<i>Transfers and remittances</i>	Any positive net transfers received from others	Dummy variable equaling one if net transfers to the household in the last 12 months (transfers received minus transfers made) were greater than zero.	A <i>negative</i> value indicates that households receiving program benefits were less likely to be net beneficiaries of private transfers. A value of -0.08 means that the program reduced the proportion of households that were net recipients of private transfers by 8 percentage points.
	Value of net transfers received from others	Value (birr) of net transfers received from other households (transfers in cash and in kind received minus transfers in cash and in kind made).	A <i>negative</i> value indicates that households receiving program benefits received lower net private transfers. A value of -30 means that the program reduced net transfers received by the household by 30 birr.

Table 2. Average impact of any receipt of public works transfers on household food security and welfare

	Tigray			Amhara			Oromiya			SNNPR			Full sample		
	Mean		Impact	Mean		Impact	Mean		Impact	Mean		Impact	Mean		Impact
	Public works	Non-public works		Public works	Non-public works		Public works	Non-public works		Public works	Non-public works		Public works	Non-public works	
<i>Household food security</i>															
Caloric acquisition is less than 1,800 kcal/day/capita in last 7 days	0.228	0.355	-0.127 (1.570)	0.353	0.235	0.118 (1.487)	0.332	0.286	0.046 (0.533)	0.392	0.373	0.019 (0.223)	0.294	0.311	-0.017 (0.448)
Daily per capita caloric acquisition in last 7 days	2,632	2,348	284.0** (2.022)	2,360	2,506	-145.7 (0.767)	2,409	2,598	-188.5 (1.060)	2,303	2,278	25.47 (0.164)	2,485	2,431	54.24 (0.669)
Change in months of food security, 2004-06	0.310	0.476	-0.166 (0.568)	0.401	-0.188	0.589 (1.808)	0.296	0.089	0.207 (0.996)	0.000	-0.071	0.071 (0.320)	0.228	0.063	0.164 (1.414)
Change in the square of the food gap, 2004-06	-2.553	-3.495	0.940 (0.368)	-2.264	1.721	-3.984 (1.091)	-2.133	-1.852	-0.280 (0.114)	0.309	-0.798	1.107 (0.536)	-1.378	0.025	-1.403 (1.118)
Number of children's meals/day, hungry season	2.724	2.843	-0.119 (0.773)	2.692	2.856	-0.164 (1.134)	2.463	2.474	-0.011 (0.148)	2.810	2.922	-0.112 (1.237)	2.667	2.698	-0.031 (0.718)
<i>Household consumption expenditure</i>															
Per capita food expenditure	67.88	61.95	5.931 (1.463)	64.62	60.67	3.947 (0.838)	55.83	58.21	-2.283 (0.581)	44.42	45.45	-1.029 (0.366)	58.52	57.47	1.051 (0.616)
Per capita total expenditure	87.49	89.44	-1.943 (0.303)	88.92	88.96	-0.045 (0.006)	79.38	87.20	-7.815 (1.643)	74.55	88.63	-14.08 (1.413)	79.76	83.02	-3.264 (1.558)

NOTES:

1. Sample sizes in matched samples by region for PW beneficiaries (n_B) and PW nonbeneficiaries (n_{NB}): Tigray: $n_B = 313$, $n_{NB} = 105$; Amhara: $n_B = 277$, $n_{NB} = 113$; Oromiya: $n_B = 294$, $n_{NB} = 129$; SNNPR: $n_B = 324$, $n_{NB} = 158$; full sample: $n_B = 1,234$, $n_{NB} = 524$.
2. Estimates for daily caloric acquisition per capita and caloric acquisition of at least 1,800 kcal/day/capita based on trimmed sample of households with daily caloric acquisition per capita of at least 1,200 kcal and not more than 4,800 kcal.
3. Estimates for per capita food expenditure and per capita total expenditure based on samples in which the top 5 percent and bottom 5 percent of the expenditure distribution was removed for each variable in order to reduce the effect of severe outliers.
4. Absolute value of t-statistics in parentheses is based on bootstrapped standard errors.
5. * significant at the 10 percent level; ** significant at the 5 percent level; *** significant at the 1 percent level.

Table 3. Average impact of any receipt of public works transfers on productivity enhancement and investment

	Tigray			Amhara			Oromiya			SNNPR			Full sample		
	Mean		Impact	Mean		Impact	Mean		Impact	Mean		Impact	Mean		Impact
	Public works	Non-public works		Public works	Non-public works		Public works	Non-public works		Public works	Non-public works		Public works	Non-public works	
<i>Credit use</i>															
Any credit use	0.387	0.340	0.047 (0.631)	0.329	0.204	0.125** (2.186)	0.051	0.047	0.004 (0.153)	0.367	0.290	0.077 (1.716)	0.367	0.296	0.071*** (2.872)
Credit taken for production	0.233	0.190	0.043 (0.640)	0.225	0.187	0.037 (0.472)	2,409	2,598	-188.5 (1.060)	0.040	0.020	0.020 (1.163)	0.122	0.101	0.021 (1.006)
Credit taken for consumption	0.128	0.143	-0.015 (0.317)	0.139	0.034	0.105** (2.467)	0.286	0.216	0.070 (1.317)	0.269	0.233	0.036 (0.878)	0.205	0.170	0.035* (1.716)
Problem repaying any loan	0.128	0.084	0.046 (0.947)	0.182	0.109	0.073 (1.171)	0.058	0.056	0.002 (0.057)	0.117	0.127	-0.010 (0.363)	0.113	0.098	0.015 (0.843)
Problem repaying a production loan	0.077	0.065	0.012 (0.290)	0.107	0.099	0.008 (0.176)	0.010	0.003	0.007 (0.677)	0.019	0.013	0.006 (0.474)	0.048	0.044	0.004 (0.308)
Problem repaying a consumption loan	0.054	0.020	0.034 (1.946)	0.075	0.010	0.065 (1.670)	0.048	0.054	-0.006 (0.226)	0.099	0.116	-0.017 (0.640)	0.067	0.056	0.011 (1.015)
<i>Use of improved agricultural technologies</i>															
Use of fertilizer	0.249	0.208	0.041 (0.742)	0.085	0.115	-0.035 (0.581)	0.082	0.131	-0.049 (1.534)	0.324	0.242	0.082** (2.309)	0.186	0.187	-0.001 (0.066)
Use of improved seeds	0.070	0.044	0.026 (0.720)	0.027	0.039	-0.012 (0.357)	0.014	0.032	-0.018 (1.279)	0.077	0.028	0.049*** (2.729)	0.048	0.037	0.011 (1.117)
<i>Own business activity</i>															
Any nonfarm own business activity in past 12 months	0.208	0.121	0.087** (2.114)	0.144	0.089	0.055 (1.561)	0.177	0.159	0.018 (0.438)	0.398	0.311	0.087** (2.213)	0.241	0.189	0.052*** (2.872)
Entry into nonfarm own business in past 2 years	0.051	0.038	0.013 (0.537)	0.065	0.010	0.055*** (3.225)	0.041	0.052	-0.011 (0.495)	0.130	0.099	0.031 (0.241)	0.075	0.060	0.015 (1.191)
<i>Assets</i>															
Change in log value of livestock and tools, 2004-06	0.268	0.392	-0.126 (0.811)	0.049	0.694	-0.645* (1.802)	0.400	0.494	-0.094 (0.561)	0.970	1.041	-0.071 (0.357)	0.448	0.673	-0.225*** (2.776)

NOTES:

1. Sample sizes in matched samples by region for PW beneficiaries (n_B) and PW nonbeneficiaries (n_{NB}): Tigray: $n_B = 313$, $n_{NB} = 105$; Amhara: $n_B = 277$, $n_{NB} = 113$; Oromiya: $n_B = 294$, $n_{NB} = 129$; SNNPR: $n_B = 324$, $n_{NB} = 158$; full sample: $n_B = 1,234$, $n_{NB} = 524$.
2. Absolute value of t-statistics in parentheses is based on bootstrapped standard errors.
3. * significant at the 10 percent level; ** significant at the 5 percent level; *** significant at the 1 percent level.

Table 4. Average impact of any receipt of public works transfers on disincentives for labor market participation and crowding out of private transfers

	Tigray			Amhara			Oromiya			SNNPR			Full sample		
	Mean		Impact	Mean		Impact	Mean		Impact	Mean		Impact	Mean		Impact
	Public works	Non-public works		Public works	Non-public works		Public works	Non-public works		Public works	Non-public works		Public works	Non-public works	
<i>Labor market participation</i>															
Any wage employment in past 12 months	0.252	0.254	-0.002 (0.031)	0.292	0.348	-0.056 (1.052)	0.282	0.267	0.015 (0.370)	0.253	0.237	0.016 (0.413)	0.268	0.273	-0.005 (0.217)
Any wage employment by males in past 12 months	0.236	0.239	-0.002 (0.035)										0.249	0.251	-0.003 (0.124)
Any wage employment by females in past 12 months	0.067	0.034	0.033 (1.529)										0.079	0.079	-0.001 (0.042)
Share of member months of wage work by females	0.147	0.246	-0.098 (0.542)										0.181	0.195	-0.015 (0.331)
Entry into wage employment in past 2 years	0.051	0.141	-0.080* (1.727)	0.069	0.120	-0.051 (1.320)	0.061	0.083	-0.022 (0.705)	0.111	0.072	0.039 (1.455)	0.073	0.104	-0.031** (2.078)
Entry by males into wage employment in past 2 years	0.035	0.109	-0.074* (1.697)										0.058	0.088	-0.030** (2.106)
Entry by females into wage employment in past 2 years	0.013	0.018	-0.005 (0.313)										0.019	0.024	-0.006 (0.913)
<i>Transfers and remittances</i>															
Any positive net transfers received from others	0.093	0.069	0.024 (0.839)	0.083	0.141	-0.058 (1.457)	0.112	0.097	0.015 (0.420)	0.133	0.133	0.000 (0.010)	0.107	0.097	0.009 (0.724)
Value of net transfers received from others	17.16	-7.04	24.20 (0.509)	22.73	9.37	13.36 (0.710)	12.88	-12.71	25.59 (1.098)	-23.54	5.79	-29.33 (-1.432)	5.139	-5.194	10.33 (0.766)

NOTES:

1. Sample sizes in matched samples by region for joint PW-OFSP beneficiaries (n_B) and nonbeneficiaries (n_{NB}) of either program: Tigray: $n_B = 313$, $n_{NB} = 105$; Amhara: $n_B = 277$, $n_{NB} = 113$; Oromiya: $n_B = 294$, $n_{NB} = 129$; SNNPR: $n_B = 324$, $n_{NB} = 158$; full sample: $n_B = 1,234$, $n_{NB} = 524$.
2. Absolute value of t-statistics in parentheses is based on bootstrapped standard errors.
3. * significant at the 10 percent level; ** significant at the 5 percent level; *** significant at the 1 percent level.

Table 5. Average impact of public works transfers of at least 90 birr per household member on food security and welfare: PSM

	Tigray			Amhara			Oromiya			SNNPR			Full sample		
	Mean		Impact	Mean		Impact	Mean		Impact	Mean		Impact	Mean		Impact
	Public works	Non-public works		Public works	Non-public works		Public works	Non-public works		Public works	Non-public works		Public works	Non-public works	
<i>Household food security</i>															
Caloric acquisition is less than 1,800 kcal/day/capita in last 7 days	0.189	0.381	-0.192 (1.409)									0.277	0.381	-0.112** (2.036)	
Daily per capita caloric acquisition in last 7 days	2717	2232	485.3* (1.907)									2551	2368	183.4 (1.568)	
Change in months of food security, 2004-06	0.551	0.468	0.083 (0.158)									0.410	0.252	0.158 (0.833)	
Change in the square of the food gap, 2004-06	-4.692	-3.144	-1.548 (0.463)									5.697	3.629	2.067 (0.647)	
Number of children's meals/day, hungry season	2.708	2.982	-0.274 (1.600)									2.739	2.785	-0.046 (0.609)	
<i>Household consumption expenditure</i>															
Per capita food expenditure	72.43	68.44	3.989 (0.451)									65.29	64.39	0.91 (0.281)	
Per capita total expenditure	95.24	93.91	1.330 (0.107)									89.55	94.49	-4.94 (1.182)	

NOTES:

1. Sample sizes in matched samples by region for PW beneficiaries (n_B) and PW nonbeneficiaries (n_{NB}): Tigray: $n_B = 156$, $n_{NB} = 58$, $n_B = 485$, $n_{NB} = 234$.
2. Estimates for daily caloric acquisition per capita and caloric acquisition of at least 1,800 kcal/day/capita based on trimmed sample of households with daily caloric acquisition per capita of at least 1,200 kcal and not more than 4,800 kcal.
3. Estimates for per capita food expenditure and per capita total expenditure based on samples in which the top 5 percent and bottom 5 percent of the expenditure distribution was removed for each variable in order to reduce the effect of severe outliers.
4. Absolute value of t-statistics in parentheses is based on bootstrapped standard errors.
5. * significant at the 10 percent level; ** significant at the 5 percent level; *** significant at the 1 percent level.

Table 6. Average impact of public works transfers of at least 90 birr per household member on productivity enhancement and investment: PSM

	Tigray			Amhara			Oromiya			SNNPR			Full sample		
	Mean		Impact	Mean		Impact	Mean		Impact	Mean		Impact	Mean		Impact
	Public works	Non-public works		Public works	Non-public works		Public works	Non-public works		Public works	Non-public works		Public works	Non-public works	
<i>Credit use</i>															
Any credit us	0.372	0.502	-0.130 (1.109)									0.351	0.363	-0.012 (0.290)	
Credit taken for production	0.179	0.312	-0.133 (1.315)									0.113	0.149	-0.036 (1.097)	
Credit taken for consumption	0.141	0.178	-0.037 (0.362)									0.194	0.188	0.006 (0.184)	
Problem repaying any loan	0.071	0.234	-0.163* (1.897)									0.093	0.161	-0.068** (2.005)	
Problem repaying a production loan	0.038	0.221	-0.183** (2.208)									0.033	0.098	-0.065** (2.259)	
Problem repaying a consumption loan	0.032	0.013	0.019 (0.694)									0.060	0.064	-0.004 (0.191)	
<i>Use of improved agricultural technologies</i>															
Use of fertilizer	0.173	0.261	-0.087 (0.947)									0.188	0.201	-0.014 (0.437)	
Use of improved seeds	0.038	0.178	-0.140* (1.961)									0.039	0.078	-0.039 (1.490)	
<i>Own business activity</i>															
Any nonfarm own business activity in past 12 months	0.205	0.111	0.094 (1.270)									0.241	0.771	0.065** (2.122)	
Entry into nonfarm own business in past 2 years	0.064	0.034	0.031 (0.643)									0.070	0.884	-0.018 (0.628)	
<i>Assets</i>															
Change in log value of livestock and tools, 2004-06	0.270	0.341	-0.071 (0.218)									0.478	0.662	-0.185 (1.570)	

NOTES:

1. Sample sizes in matched samples by region for PW beneficiaries (n_B) and PW nonbeneficiaries (n_{NB}): Tigray: $n_B = 156$, $n_{NB} = 58$; full sample: $n_B = 485$, $n_{NB} = 234$.
2. Absolute value of t-statistics in parentheses is based on bootstrapped standard errors.
3. * significant at the 10 percent level; ** significant at the 5 percent level; *** significant at the 1 percent level.

Table 7. Average impact of public works transfers of at least 90 birr per household member on disincentives for labor market participation and crowding out of private transfers: PSM

	Tigray			Amhara			Oromiya			SNNPR			Full sample		
	Mean		Impact	Mean		Impact	Mean		Impact	Mean		Impact	Mean		Impact
	Public works	Non-public works		Public works	Non-public works		Public works	Non-public works		Public works	Non-public works		Public works	Non-public works	
<i>Labor market participation</i>															
Any wage employment in past 12 months	0.218	0.353	-0.135 (1.276)										0.260	0.271	-0.011 (0.301)
Any wage employment by males in past 12 months	0.186	0.335	-0.149 (1.478)										0.228	0.257	-0.029 (0.770)
Any wage employment by females in past 12 months	0.045	0.027	0.018 (0.457)										0.168	0.221	-0.053 (0.549)
Share of member months of wage work by females															
Entry into wage employment in past 2 years	0.064	0.274	-0.210** (2.079)										0.065	0.152	-0.088*** (2.51)
Entry by males into wage employment in past 2 years	0.032	0.252	-0.220** (2.330)										0.035	0.145	-0.110*** (3.00)
Entry by females into wage employment in past 2 years	0.026	0.013	0.013 (0.364)										0.020	0.018	0.002 (0.175)
<i>Transfers and remittances</i>															
Any positive net transfers received from others	0.109	0.060	0.049 (0.915)										0.087	0.090	-0.003 (0.120)
Value of net transfers received from others	15.13	23.70	38.82 (0.450)										-3.50	-28.44	24.93 (0.975)

NOTES:

1. Sample sizes in matched samples by region for PW beneficiaries (n_B) and PW nonbeneficiaries (n_{NB}): Tigray: $n_B = 156$, $n_{NB} = 58$; full sample: $n_B = 485$, $n_{NB} = 234$.
2. Absolute value of t-statistics in parentheses is based on bootstrapped standard errors.
3. * significant at the 10 percent level; ** significant at the 5 percent level; *** significant at the 1 percent level.

**Table 8. Average impact of public works transfers of at least 90 birr per household member on food security and welfare:
Nearest neighbor matching**

	Tigray			Amhara			Oromiya			SNNPR			Full sample		
	Mean		Impact	Mean		Impact	Mean		Impact	Mean		Impact	Mean		Impact
	Public works	Non-public works		Public works	Non-public works		Public works	Non-public works		Public works	Non-public works		Public works	Non-public works	
<i>Household food security</i>															
Caloric acquisition is less than 1,800 kcal/day/capita in last 7 days			-0.130** (2.010)												-0.106** (2.536)
Daily per capita caloric acquisition in last 7 days			453.9** (3.515)												180.6** (2.170)
Change in months of food security, 2004-06			0.373 (1.505)												0.234 (1.602)
Change in the square of the food gap, 2004-06			-2.137 (1.157)												-1.480 (1.211)
Number of children's meals/day, hungry season			-0.154* (1.784)												-0.104** (1.988)
<i>Household consumption expenditure</i>															
Per capita food expenditure			1.075 (0.276)												2.214 (0.904)
Per capita total expenditure			-6.341 (1.321)												-6.288** (2.074)

NOTES:

1. Sample sizes in matched samples by region for PW beneficiaries (n_B) and PW nonbeneficiaries (n_{NB}): Tigray: $n_B = 156$, $n_{NB} = 58$.
2. Estimates for daily caloric acquisition per capita and caloric acquisition of at least 1,800 kcal/day/capita based on trimmed sample of households with daily caloric acquisition per capita of at least 1,200 kcal and not more than 4,800 kcal.
3. Estimates for per capita food expenditure and per capita total expenditure based on samples in which the top 5 percent and bottom 5 percent of the expenditure distribution was removed for each variable in order to reduce the effect of severe outliers.
4. Absolute value of t-statistics is in parentheses.
5. * significant at the 10 percent level; ** significant at the 5 percent level; *** significant at the 1 percent level.

Table 9. Average impact of public works transfers of at least 90 birr per household member on productivity enhancement and investment: *Nearest neighbor matching*

	Tigray			Amhara			Oromiya			SNNPR			Full sample		
	Mean		Impact	Mean		Impact	Mean		Impact	Mean		Impact	Mean		Impact
	Public works	Non-public works		Public works	Non-public works		Public works	Non-public works		Public works	Non-public works		Public works	Non-public works	
<i>Credit use</i>															
Any credit us			-0.018 (0.262)												0.016 (0.415)
Credit taken for production			-0.044 (0.819)												-0.006 (0.309)
Credit taken for consumption			-0.040 (0.705)												0.005 (0.169)
Problem repaying any loan			-0.117*** (3.168)												-0.006 (0.309)
Problem repaying a production loan			-0.135** (4.212)												-0.010 (0.700)
Problem repaying a consumption loan			0.017 (0.860)												0.004 (0.221)
<i>Use of improved agricultural technologies</i>															
Use of fertilizer			-0.057 (1.137)												0.036 (1.587)
Use of improved seeds			-0.067*** (3.701)												0.005 (0.396)
<i>Own business activity</i>															
Any nonfarm own business activity in past 12 months			0.113** (2.552)												0.068** (2.250)
Entry into nonfarm own business in past 2 years			0.019 (0.495)												0.014 (0.839)
<i>Assets</i>															
Change in log value of livestock and tools, 2004-06			0.038 (0.229)												-0.169 (1.526)

NOTES:

1. Sample sizes in matched samples by region for PW beneficiaries (n_B) and PW nonbeneficiaries (n_{NB}): Tigray: $n_B = 156$, $n_{NB} = 58$.
2. Absolute value of t-statistics is in parentheses.
3. * significant at the 10 percent level; ** significant at the 5 percent level; *** significant at the 1 percent level.

Table 10. Average impact of public works transfers of at least 90 birr per household member on disincentives for labor market participation and crowding out of private transfers: *Nearest neighbor matching*

	Tigray			Amhara			Oromiya			SNNPR			Full sample		
	Mean		Impact	Mean		Impact	Mean		Impact	Mean		Impact	Mean		Impact
	Public works	Non-public works		Public works	Non-public works		Public works	Non-public works		Public works	Non-public works		Public works	Non-public works	
<i>Labor market participation</i>															
Any wage employment in past 12 months			-0.027 (0.540)												0.018 (0.665)
Any wage employment by males in past 12 months			-0.017 (0.305)												
Any wage employment by females in past 12 months			0.016 (0.607)												
Share of member months of wage work by females															
Entry into wage employment in past 2 years			-0.091* (1.791)												-0.014 (0.839)
Entry by males into wage employment in past 2 years			-0.092** (1.960)												0.002 (0.068)
Entry by females into wage employment in past 2 years			0.001 (0.037)												0.004 (0.298)
<i>Transfers and remittances</i>															
Any positive net transfers received from others			0.082 (1.394)												-0.002 (0.062)
Value of net transfers received from others			19.19 (0.294)												1.264 (0.056)

NOTES:

1. Sample sizes in matched samples by region for PW beneficiaries (n_B) and PW nonbeneficiaries (n_{NB}): Tigray: $n_B = 156$, $n_{NB} = 58$.
2. Absolute value of t-statistics is in parentheses.
3. * significant at the 10 percent level; ** significant at the 5 percent level; *** significant at the 1 percent level.

Table 11. Average joint impact of public works and OFSP transfers on household food security and welfare

	Tigray			Amhara			Oromiya			SNNPR			Full sample		
	Mean		Impact	Mean		Impact	Mean		Impact	Mean		Impact	Mean		Impact
	Public works	Non-public works		Public works	Non-public works		Public works	Non-public works		Public works	Non-public works		Public works	Non-public works	
<i>Household food security</i>															
Caloric acquisition is less than 1,800 kcal/day/capita in last 7 days	0.231	0.296	-0.065 (0.843)	0.229	0.429	-0.201 (1.179)	0.281	0.205	0.077 (0.492)	0.318	0.399	-0.081 (0.326)	0.271	0.321	-0.050 (1.023)
Daily per capita caloric acquisition in last 7 days	2723	2364	359.0*** (2.665)	2577	2268	308.7 (1.086)	2408	2775	-367.2 (1.166)	2442	2264	177.6 (0.363)	2577	2347	230.0*** (2.608)
Change in months of food security, 2004-06	0.346	-1.314	1.661** (2.108)	0.659	0.291	0.368 (0.760)	0.851	0.632	0.219 (0.373)	-0.175	0.179	-0.355 (0.615)	0.361	-0.008	0.369** (2.351)
Change in the square of the food gap, 2004-06	-2.404	8.087	-5.683 (1.240)	-5.818	-0.079	-5.739 (1.383)	-8.638	-5.922	-2.716 (0.356)	1.439	-2.173	3.612 (0.666)	-2.918	0.317	-3.325** (2.457)
Number of children's meals/day, hungry season	2.658	3.308	-0.623 (1.243)	2.786	2.795	-0.009 (0.027)	2.750	2.735	0.015 (0.068)	2.792	3.076	-0.285 (1.417)	2.738	2.695	0.044 (0.556)
<i>Household consumption expenditure</i>															
Per capita food expenditure	71.58	78.72	-7.136 (0.688)	73.80	51.54	22.62*** (2.950)	59.41	66.02	-6.609 (0.830)	48.09	49.08	-0.990 (0.146)	66.28	61.52	4.758* (1.892)
Per capita total expenditure	92.12	98.01	-5.885 (0.485)	102.80	76.23	26.57** (2.475)	81.62	89.39	-7.773 (0.650)	65.91	71.92	-6.006 (0.656)	88.16	86.33	1.826 (0.619)

NOTES:

1. Sample sizes in matched samples by region for PW beneficiaries (n_B) and PW nonbeneficiaries (n_{NB}): Tigray: $n_B = 208$, $n_{NB} = 53$; Amhara: $n_B = 88$, $n_{NB} = 45$; Oromiya: $n_B = 47$, $n_{NB} = 26$; SNNPR: $n_B = 57$, $n_{NB} = 40$; full sample: $n_B=416$, $n_{NB} = 223$.
2. Estimates for daily caloric acquisition per capita and caloric acquisition of at least 1,800 kcal/day/capita based on trimmed sample of households with daily caloric acquisition per capita of at least 1,200 kcal and not more than 4,800 kcal.
3. Estimates for per capita food expenditure and per capita total expenditure based on samples in which the top 5 percent and bottom 5 percent of the expenditure distribution was removed for each variable in order to reduce the effect of severe outliers.
4. Absolute value of t-statistics is in parentheses based on bootstrapped standard errors.
5. * significant at the 10 percent level; ** significant at the 5 percent level; *** significant at the 1 percent level.

Table 12. Average impact of public works and OFSP transfers on productivity enhancement and investment

	Tigray			Amhara			Oromiya			SNNPR			Full sample		
	Mean		Impact	Mean		Impact	Mean		Impact	Mean		Impact	Mean		Impact
	Public works	Non-public works		Public works	Non-public works		Public works	Non-public works		Public works	Non-public works		Public works	Non-public works	
<i>Credit use</i>															
Any credit use	0.433	0.138	0.295* (1.685)	0.545	0.237	0.308*** (3.008)	0.340	0.268	0.072 (0.634)	0.404	0.406	-0.003 (0.022)	0.401	0.279	0.123** (2.512)
Credit taken for production	0.284	0.090	0.194 (1.319)	0.420	0.112	0.308*** (3.209)	0.085	0.054	0.031 (0.381)	0.070	0.027	0.043 (0.797)	0.224	0.100	0.124*** (4.040)
Credit taken for consumption	0.111	0.055	0.056 (0.522)	0.114	0.103	0.011 (0.189)	0.234	0.193	0.041 (0.364)	0.228	0.331	-0.103 (0.899)	0.142	0.174	-0.032 (0.739)
Problem repaying any loan	0.130	0.024	0.106*** (3.743)	0.250	0.105	0.145 (1.602)	0.000	0.038	-0.038 (0.825)	0.158	0.078	0.080 (1.014)	0.137	0.062	0.075*** (3.202)
Problem repaying a production loan	0.082	0.018	0.064*** (2.913)	0.193	0.093	0.100 (1.162)	0.000	0.000	0.000 (0.020)	0.053	0.000	0.053* (1.870)	0.089	0.033	0.056*** (3.464)
Problem repaying a consumption loan	0.053	0.013	0.040** (2.486)	0.068	0.012	0.056** (1.999)	0.000	0.038	-0.038 (0.842)	0.105	0.078	0.027 (0.358)	0.053	0.033	0.020 (1.139)
<i>Use of improved agricultural technologies</i>															
Use of fertilizer	0.240	0.142	0.098 (0.580)	0.216	0.146	0.070 (1.137)	0.170	0.043	0.127 (1.445)	0.491	0.373	0.118 (1.198)	0.267	0.160	0.107*** (3.021)
Use of improved seeds	0.077	0.018	0.059** (2.259)	0.057	0.014	0.043 (1.463)	0.021	0.006	0.016 (0.596)	0.140	0.057	0.084 (1.198)	0.082	0.033	0.048** (2.298)
<i>Own business activity</i>															
Any nonfarm own business activity in past 12 months	0.197	0.046	0.151 (1.212)	0.318	0.145	0.173** (1.994)	0.255	0.131	0.124 (1.498)	0.333	0.306	0.027 (0.272)	0.252	0.186	0.067* (1.754)
Entry into nonfarm own business in past 2 years	0.048	0.024	0.024 (0.194)	0.136	0.017	0.120** (2.558)	0.085	0.063	0.022 (0.029)	0.123	0.072	0.051 (0.816)	0.070	0.052	0.025 (1.152)
<i>Assets</i>															
Change in log value of livestock and tools, 2004-06	0.446	0.182	0.265 (0.927)	0.209	0.065	0.144 (0.704)	0.786	1.202	-0.416 (0.900)	0.921	1.153	-0.232 (0.452)	0.466	0.523	-0.057 (0.427)

NOTES:

1. Sample sizes in matched samples by region for PW beneficiaries (n_B) and PW nonbeneficiaries (n_{NB}): Tigray: $n_B = 208$, $n_{NB} = 53$; Amhara: $n_B = 88$, $n_{NB} = 45$; Oromiya: $n_B = 47$, $n_{NB} = 26$; SNNPR: $n_B = 57$, $n_{NB} = 40$; full sample: $n_B = 416$, $n_{NB} = 223$.
2. Absolute value of t-statistics in parentheses is based on bootstrapped standard errors.
3. * significant at the 10 percent level; ** significant at the 5 percent level; *** significant at the 1 percent level.

Table 13. Average impact of public works and OFSP transfers on disincentives for labor market participation and crowding out of private transfers

	Tigray			Amhara			Oromiya			SNNPR			Full sample		
	Mean		Impact	Mean		Impact	Mean		Impact	Mean		Impact	Mean		Impact
	Public works	Non-public works		Public works	Non-public works		Public works	Non-public works		Public works	Non-public works		Public works	Non-public works	
<i>Labor market participation</i>															
Any wage employment in past 12 months	0.255	0.229	0.026 (0.108)	0.455	0.348	0.107 (1.066)	0.255	0.417	-0.162 (1.602)	0.140	0.213	-0.073 (0.624)	0.320	0.287	0.033 (0.762)
Any wage employment by males in past 12 months	0.238	0.194	0.044 (0.194)										0.296	0.252	0.043 (1.124)
Any wage employment by females in past 12 months	0.057	0.084	-0.027 (0.182)										0.089	0.076	0.013 (0.587)
Share of member months of wage work by females													0.167	0.302	-0.135 (1.421)
Entry into wage employment in past 2 years	0.063	0.022	0.041 (0.363)	0.125	0.103	0.022 (0.367)	0.106	0.194	-0.088 (1.010)	0.070	0.112	-0.042 (0.512)	0.099	0.085	0.013 (0.533)
Entry by males into wage employment in past 2 years	0.041	0.029	0.012 (0.202)										0.082	0.076	0.006 (0.246)
Entry by females into wage employment in past 2 years	0.010	0.004	0.007 (0.654)										0.024	0.015	0.009 (0.883)
<i>Transfers and remittances</i>															
Any positive net transfers received from others	0.093	0.043	0.050 (0.462)	0.102	0.202	-0.100 (1.090)	0.043	0.153	-0.110 (1.272)	0.053	0.075	-0.023 (0.403)	0.099	0.108	-0.009 (0.352)
Value of net transfers received from others	1.107	-0.694	1.801 (0.023)	-30.12	59.50	-89.62 (1.356)	13.92	-97.32	111.3 (0.765)	2.998	-29.11	32.11 (0.900)	10.35	-4.422	14.77 (0.888)

NOTES:

1. Sample sizes in matched samples by region for joint PW-OFSP beneficiaries (n_B) and nonbeneficiaries (n_{NB}) of either program: Tigray: $n_B = 208$, $n_{NB} = 53$; Amhara: $n_B = 88$, $n_{NB} = 45$; Oromiya: $n_B = 47$, $n_{NB} = 26$; SNNPR: $n_B = 57$, $n_{NB} = 40$; full sample: $n_B = 416$, $n_{NB} = 223$.
2. Absolute value of t-statistics in parentheses is based on bootstrapped standard errors.
3. * significant at the 10 percent level; ** significant at the 5 percent level; *** significant at the 1 percent level.

Table 14. Share of joint PW-OFSP beneficiaries who received this component of OFSP

OFSP Component	Share of joint PW-OFSP beneficiaries who received this component of OFSP
	(percent)
Improved seeds	17.8
Other seeds	6.5
Tools	14.9
Irrigation	32.5
Soil and water conservation (SWC)	58.7
Pasture	17.3
Credit	39.7
Chicks	12.5
Livestock	17.8
Bees	8.9
Other OFSP	4.3
Any component other than SWC	84.6